British Journal of Neurosurgery, October 2013; 27(5): 556–576

ISSN: 0268-8697 print / ISSN 1360-046X online
DOI: 10.3109/02688697.2013.833786

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healthcare

PROCEEDINGS

Proceedings of the 2013 Autumn meeting of the Society of British Neurological Surgeons

This meeting is being hosted by the Essex Neurosciences Centre, Romford, commencing on 25 September 2013.

The full abstracts of the platform presentations are followed by the titles of those submissions accepted as posters. The order of abstracts is that of presentation.

These papers are published in advance of the meeting – if any papers are subsequently withdrawn or not read to the society – an addendum to this effect will be published in the next issue of the journal.

PRESENTED ABSTRACTS

WM1 – Trauma

WM1-1: Surgery for traumatic intracerebral haemorrhage – Results of STITCH(trauma)

A. D. Mendelow, B. A. Gregson, E. N. Rowan, R. Francis & P. M. Mitchell

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Objectives. To establish whether a policy of early surgery for traumatic intracerebral haemorrhage (TICH) improves outcome compared with a policy of initial conservative treatment.
Design. International multicentre pragmatic randomised parallel group trial with primary outcome measured at six months.
Subjects. This study planned to recruit 840 adult patients with TICH. Patients had no more than two haematomas greater than 10 ml and were within 48 hours of head injury. They did not have a SDH or EDH that required evacuation.
Methods. Patients were randomised via an independent telephone/web-based randomisation service to early surgery within 12 hours or initial conservative treatment. Extended Glasgow Outcome Scale was measured at 6 and 12 months via a postal questionnaire.
Results. Patient recruitment began in 2010 but was halted by funding body for low UK recruitment in September 2012. At that point 170 patients had been randomised from 31 centres in 13 countries. India recruited 74 patients from 11 centres and Europe 27 from 12. Patients in India were younger (median age 43) and victims of RTA (82%) while European patients were older (64) and more likely to have fallen. Six-month outcomes have been obtained for 99% and 12-month outcomes data collection is ongoing. This paper will present the primary outcomes.
Conclusions. This is the first ever trial of surgery for TICH and will indicate whether further research is warranted. For further information see http://research.ncl.ac.uk/trauma.stitch.

WM1-2: Measurement and optimisation of spinal cord perfusion pressure in acute spinal cord injury

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Objectives. We describe a novel technique to measure intraspinal pressure (ISP) at the injury site in patients with severe acute traumatic spinal cord injury (TSCI), analogous to measuring ICP after TBI.
Subjects. We recruited 18–70 year old patients with severe acute TSCI.
Methods. A Codman ICP probe was placed subdurally during spinal stabilisation. ISP was monitored within 72 hours of injury, for up to 1 week. Cord blood flow was assessed with indocyanine green fluorescence, autoregulation using sPRx and sRAP, and cord function with motor evoked potentials. We determined the effect of different treatments on spinal cord perfusion pressure (SCPP) and cord function.
Results. 30 subjects were recruited (14 with TSCI, 16 without). ISP was initially high (>20 mmHg) and normalised (21%), normal then high (29%), high throughout (29%) or normal throughout (21%). ISP remained high in 78% patients after bony decompression. Laminectomy was potentially detrimental by exposing the swollen cord to external compression forces. pCO2, sevoflurane and mannitol had no significant effect on ISP or SCPP. Inotropes increased SCPP ($p < 0.05$) and blood flow at the injury site. Optimal SCPP varied between patients. Optimising SCPP improved autoregulation and motor evoked potential amplitudes ($p < 0.01$).
Conclusions. After severe TSCI, ISP at the injury site is elevated and SCPP is reduced. Our data indicate high ISP and low SCPP are harmful. By intervening to increase SCPP, we could improve spinal cord function in some patients.

WM1-3: Developing the evidence base in neurosurgery: the case of decompressive craniectomy following traumatic brain injury

A. G. Kolias, I. Timofeev, E. A. Corteen, M. Czosnyka, J. D. Pickard, D. K. Menon, P. J. Kirkpatrick & P. J. Hutchinson, on behalf of the Rescueicp the Rescue-Asdh Collaborative Groups

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Objectives. In the context of TBI, decompressive craniectomy (DC) is used as part of tiered therapeutic protocols for patients with intracranial hypertension (secondary or protocol-driven DC). In addition, the bone flap can be left out when evacuating an acute subdural haematoma (ASDH) in the acute phase (primary DC).
Design. Progress report of two UK-led randomised trials of DC.
Subjects. RESCUEicp is focusing on TBI patients with refractory intracranial hypertension. RESCUE-ASDH is focusing on patients with ASDH.
Methods. In RESCUEicp, eligible patients are randomised to DC versus advanced medical management. In RESCUE-ASDH, eligible patients are randomised to DC versus craniotomy.
Results. More than 90% of the required sample size (n = 400) has been recruited in the RESCUEicp study. In terms of the baseline characteristics of the first 350 patients, the median age is 31 years, median pre-intubation GCS was 7, and pupillary abnormalities were present in 19%. It is hoped that the results (primary end point) will be reported in 2014. The RESCUE-ASDH study aims to compare the clinical and cost-effectiveness of DC versus craniotomy for the management of adults undergoing evacuation of an ASDH. It will be a pragmatic trial with broad inclusion criteria, randomisation taking place in theatres after evacuation of the clot, and end-points focusing on functional outcome and quality of life.
Conclusions. These studies are expected to consolidate the evidence base underpinning clinical practice guidelines for the management of patients with TBI.

WM1-4

The national chronic subdural haematoma audit: An update and provisional results

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Objectives. Evacuation of a chronic subdural haematoma (CSDH) is a common neurosurgical procedure, however the optimal preoperative management, surgical technique and postoperative care is controversial. We proposed a prospective multi-centre audit in order to establish current practices, national benchmarks and areas for future study by the network.
Design. A prospective multi-centre audit.
Subjects. All adult patients aged 16 years and over with a primary or recurrent CSDH were eligible for inclusion.
Methods. Neurosurgical units (NSU) in the United Kingdom and Ireland were invited to recruit patients prospectively for a period of 4 months from June 2013. Data on various aspects of patient care were entered into a secure online database and analysed by the study's management group.
Results. Audit standards were determined from published systematic reviews and a randomised controlled trial. These include: clinical recurrence rate $< 20\%$; unfavourable mRS (4-6) at discharge from NSU $< 30\%$; mortality rate in NSU $< 5\%$; morbidity rate in NSU $< 10\%$. The outcome measures were: (1) clinical recurrence requiring re-operation within 60 days; (2) modified Rankin scale (mRS) score at discharge from NSU; (3) morbidity and mortality in the NSU; (4) destination at discharge from NSU; (5) length of stay in the NSU. More than 200 patients have been enrolled as of 15 August 2013. Provisional results of the audit will be presented at the Autumn SBNS meeting.
Conclusions. The audit will elucidate the contemporary management and outcomes of patients with CSDH in the United Kingdom and Ireland. It will inform national guidelines, clinical practice and future studies in order to improve the outcome of patients.
Acknowledgements. The BNTRC is an initiative of the British Neurosurgical Trainees Association (BNTA). It is a member-organisation of the UK Neurosurgical Research Network supported by the Royal College of Surgeons of England and the Society of British Neurological Surgeons.

WM1-5: Effect of the major trauma centre (MTC) on time to trauma craniotomy in Southwest London

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Objectives. To assess impact of implementation of the MTC in Southwest London in April 2010 on surgical delay for emergency head injuries in both MTC and district general hospital (DGH) patients.
Design. Retrospective audit.
Subjects. Patients with head injury transferred directly to the MTC requiring emergency surgery within 30 months of the introduction of the MTC (n = 7 in the first year, n = 8 thereafter). Patients with traumatic head injury that were transferred to DGHs, scanned and transferred to our unit for emergency neurosurgery in the 18 months before (n = 8) and following (n = 21) introduction of the MTC.
Methods. Data from clinical coding and theatre logs. Key time points of admission, imaging and surgery start. Only patients with complete timepoint data included.
Results. Mean (SEM) time from admission to CT for patients transferred directly to the MTC decreased from 63 (14) to 34 (6) minutes between the first and second year of the MTC.

Time from admission to surgery did not change: 203 (33) to 193 (50) minutes. Mean (SEM) time from admission to CT for patients at DGHs increased from 195 (77) minutes in the 2 years prior to the MTCs implementation to 235 (66) minutes after. Time from hospital transfer to surgery decreased from 134 (77) to 99 (22) minutes in this period.
Conclusions. Time to CT for emergency neurosurgery patients in the MTC has improved but time to craniotomy has not. Admission to CT time has increased for trauma patients at DGHs, but transfer time has improved. The trauma network incompletely addresses neurosurgical problems.

WM2 – Top Scoring Papers

WM2-1: Surgery for spontaneous lobar intracerebral haemorrhage – Results of STICH II similar patients from STICH

B. A. Gregson, E. N. Rowan, P. M. Mitchell & A. D. Mendelow, the STICH Investigators

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Objectives. To establish whether a policy of early surgery for spontaneous lobar intracerebral haemorrhage (ICH) improves outcome compared with a policy of initial conservative treatment.
Design. International multicentre pragmatic randomised parallel group trials with primary outcome measured at six months.
Subjects. STICH II patients had a superficial ICH of 10–100 ml with a motor GCS of 5 or 6 and an eye GCS of 2 or more and were within 48 hours of ictus and had no IVH. Patients with similar characteristics in STICH were identified.
Methods. Patients were randomised via an independent telephone/web-based randomisation service to early surgery within 12 hours or initial conservative treatment. Extended Glasgow Outcome Scale was measured at 6 months via a postal questionnaire.
Results. Between 2006 and 2012, 601 patients were recruited into STICH II from 78 centres in 27 countries. Their median age was 65, median haematoma volume was 36 ml and median GCS 13. Outcome was obtained for 97%; 41% of the early surgery patients had a favourable outcome compared to 38% of the initial conservative patients. However there was a trend towards significantly lower mortality and improved outcome using the full GOS in the early surgery group. Pooling these data with STICH confirmed these results.
Conclusions. Although there was no difference in the primary outcome of either study there were indications from secondary analysis that some patients do benefit from early surgery. For further information see http://research.ncl.ac.uk/stich.

WM2-2: MRI signal change pre-operatively is associated with baseline neurological status and can predict postoperative recovery in cervical spondylotic myelopathy

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Objectives. Can quantitative assessment of preoperative MRI scans predicts baseline patient status and neurological recovery after surgery?
Design. Blinded observational study, prospectively enrolled and followed up to 1 year postoperatively.
Subjects. 57 consecutive patients with cervical spondylotic myelopathy studied pre- & 1-year postoperatively.
Methods. Modified Japanese Orthopedic Association (mJOA), Nurick, SF-36, Neck Disability Index (NDI), 30m walk cadence (Wc) and time (Wt), grip strength and Berg Balance Scale (BBS) were administered at baseline and 1 year post surgery. Univariate and multivariate analysis were used to assess these in relation to MRI measurements pre and postoperatively.
Results. Low T1 signal change and high T2 signal change preoperatively was associated with a lower mJOA ($p = 0.0030$, 0.0035), higher Nurick ($p = 0.0298$, 0.0079), decreased grip ($p = 0.0152$), impaired Wt, Wc ($p = 0.0001$) and poor BBS ($P = 0.0005$) at baseline. Preoperative segmentation of T2 signal, showed a significant increase in Wt, Wc and BBS $p = 0.0266$; $p = 0.0167$; $p = 0.0042$). Preoperative T1 signal was associated with lower postoperative grip ($p = 0.0260$), greater Wt, Wc ($p = 0.0360$, $p = 0.0090$). Preoperative focal T2 signal had a significant association with poorer postoperative Wt, Wc ($p = 0.0220$) and Nurick ($p = 0.0230$).
Conclusions. Signal changes in MRI scans predicts baseline neurological status and to some extent postoperative recovery. The Poor MRI indicators include presence of low T1 signal, presence of focal T2 signal and segmentation of T2 signal.

WM2-3: Complications following cranioplasty in 166 patients in the Northeast of England

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Objectives. Cranioplasty is often undertaken as a routine secondary operation following craniectomy. We aimed too evaluate the complication rates following cranioplasty, investigate for possible predictors of outcome and review the literature.
Design. A multi-centre, retrospective, observational study.
Subjects. 191 patients were identified. Twenty-two patients were excluded due to cranioplasty being carried out at the time of surgery and three patients were excluded due to incorrect coding. There were no other exclusions.
Methods. Patient notes, clinic letters and discharge letters were retrospectively analysed for documentation of the craniectomy and initial pathology, the first cranioplasty and any post-operative complications for all patients who underwent surgery between June 2006 and September 2011.
Results. 67 out of 166 patients experienced at least 1 complication (40.4%) during a median follow-up time of 15 months. 35 patients (21.3%) developed infection requiring antibiotics, with 27 (16.3%) requiring further surgery. 9 of 25 patients (36%) with bifrontal defects developed an infection whereas

21 of the 153 patients (16.4%) with a defect other than bifrontal developed an infection. Further surgery in the two groups was required in 16.4% and 11.7% respectively. Pseudomeningocoele (8.9%), seizures (8.3%) and poor cosmesis (7.1%) were also commonly observed. Logistic regression analysis revealed complication to be independently associated with a poorer functional outcome ($p < 0.05$).
Conclusions: Cranioplasty carries significant morbidity, a risk that appears to be higher with a bifrontal defect. The complications experienced may affect subsequent functional outcome. These findings should be considered when making decisions relating to craniectomy and cranioplasty.

WM2-4: Pre-vertebral drains for anterior cervical discectomy surgery – Is it just another drain on NHS resources with no supporting evidence?

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Objectives. To establish whether the use of pre-vertebral drains for anterior cervical discectomy and fusion procedures (ACDF) affects the rate of post-operative haematoma, surgical site infection and reoperation within 30 days.
Design. A retrospective observational study of patients undergoing ACDF procedures with or without the use of pre-vertebral drains in one neurosurgical unit.
Subjects. Adult patients who had an operative record of an ACDF procedure during a five year period 2008–2013.
Methods. Operative records were reviewed to establish indication, the presence of a pre-vertebral drain, whether a re-operation was necessary within 30 days and the reason for re-operation.
Results. 741 procedures were recorded in 731 patients. The majority of procedures were performed for myelopathy (446; 60%) or radiculopathy (254; 34%). 616 (83%) of procedures had a pre-vertebral drain placed, where 125 (17%) had no drain. In the 'Drain' group 12 re-operations were performed, mostly for infection (4), epidural haematoma (4), with only 2 operations for pre-vertebral haematoma/collection. In the 'No Drain' group, no re-operations were performed.
Conclusions. Pre-vertebral haematoma is a very rare occurrence, and in this series had an event rate of 0.3%. Not using a pre-vertebral drain does not appear to increase the risk of causing this complication, and in fact appears to reduce the risk compared to the 'Drain' group. The 'routine' use of pre-vertebral drains may actually increase the risk of complications such as haematoma and infection.

TM3: Paediatrics/CSF

TM3-1: Lumbosacral lipoma pathology: New insights into the pathogenesis of tethered cord syndrome?

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Objectives. Scant attention has been given to the malformative aspects of lumbosacral lipoma (LSL) and the role that primary dysgenesis may play in the aetiology of "tethered cord syndrome" is unclear.
Design. Retrospective identification of surgically treated cases of LSL with review of histology and preoperative MRI.
Subjects. 55 patients (36 female) with LSL operated by a single specialist Paediatric Spinal Neurosurgeon at Great Ormond Street Hospital, London over 15 years.
Methods. Histopathological analysis of resected lumbosacral lipomas was undertaken by 2 consultant neuropathologists. Lipomas were classified from preoperative MRI scans.
Results. 25% contained overlying epidermis and dermis and in 50% an epidermal pit was present. In 75% of cases adipose tissue was not just subdermal but impinged on epidermal adnexal structures. 95% of cases showed thickened bands of connective tissue associated with peripheral nerve fascicles. 91% contained blood vessels with enlarged lumina and thickened walls. Additional neuroectodermal derivatives (glial cells, ganglion cells, leptomeninges, ependymal structures and Paccinian-like structures) were encountered in 28% of cases. Haemangioma, bone and cartilage were also observed. Greater diversity of tissues and cell types appeared in complex lipomas (transitional and chaotic) than simpler forms (dorsal and caudal).
Conclusions. These findings challenge currently held notions regarding the embryogenesis of spinal lipomas and may have implications for the mechanisms of clinical deterioration.

TM3-2: Pineal region tumours: A single unit experience over 30 years

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Objectives. Single unit experience of pineal region tumours over 30 years.
Design. Retrospective casenote/database review.
Subjects. 89 children identified.
Methods. Database review of all patients with pineal region tumours under oncological and neurosurgical service from 1978-2012. Demographics, treatment, histology, endocrine status, recurrence, educational status and survival were recorded.
Results. M:F ratio was 2:1. Median age at diagnosis was 8.4 years (range 0–15.8years). Commonest pathology was germ cell tumours (GCT) ($n = 45$) > pineal parenchymal tumour ($n = 21$) > glioma ($n = 10$), atypical teratoid/rhabdoid tumour (ATRT) ($n = 2$). 14 tumours were multifocal. 76% (68/89) were high grade. 79% (70/89) underwent biopsy or resection. 80% (61/89) received radiotherapy. No endoscopic procedures were undertaken prior to 1994; 73% of patients with hydrocephalus (22/30) underwent permanent ventriculo-peritoneal

(VP) shunting. After 1994, 50% (25/51) underwent endoscopic third venticulostomy (ETV); 12 of these had positive endoscopic biopsies. Pre-1994, only 1 patient with GCT had positive tumour markers; no surgery was carried out. Post-1994, 12 (12/32) patients with GCT had positive tumour markers and no resection. Long term endocrine replacement was required in 19 patients. Survival was best for GCT and worst for ATRT.
Conclusions. This series reflects an evolution of paediatric pineal tumour management over the last 30 years. Endoscopy, tumour markers and progress in adjuvant therapy have led to substantial changes to the management pathway.

TM3-3: Optimal cranial entry point for third ventriculostomy in pediatric patients

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Objectives. Endoscopic third ventriculostomy (ETV) is a widely used technique of CSF diversion in pediatric neurosurgery. Optimal ETV entry site is defined by the trajectory along the foramen Monroe and the third ventricular floor, but does not necessary overlap with conventionally used entry site, the Kocher's point. We retrospectively reviewed the safety profile of the standard trajectory and developed a formula to compute the location of the optimal entry site.
Design. Retrospective audit.
Subjects. Anonymized MRI scans.
Methods. Twelve patients (age range 3–12 years) were reviewed. Neuronavigation planning software was used to create 3D models to quantitate relations of the conventional versus optimal trajectories. Patients were stratified based on the ratio between the distance of the frontal horns (FH) and the bi-temporal (BT) distance at the level of the foramen Monroe (FH/BT ratio).
Results. Using conventional trajectories intersected the fornix in 4 cases (FH/BT $>$ 0.41) by breach depth 4.3 ± 0.29 mm. In 6 cases (FH/BT $<$ 0.41) the caudate nucleus was breached at 3.4 ± 2.07 mm. Using linear regression analysis the optimal entry point from Bregma was computed as $x = 70.7a\text{-}6.4$ and $y = 72.5a\text{-}14.5$ ($r^2(x) = 0.71$, $r^2(y) = 0.7$), where "a" represents FH/BP.
Conclusions. Conventional entry point for ETV produces trajectories that may breach important anatomical structures and can result in morbidity. We propose a simple mathematical formula to extract a safe, case specific entry point derived from the FH/BT ratio to facilitate preoperative planning.

TM3-4: Chiari malformation: Tonsilar decent or foramen magnum obstruction, which is a better prediction of signs and symptoms

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Objectives. To compare the value of foramen magnum obstruction with tonsilar descent in prediction of patient's Chiari related symptoms. Chiari malformation has been well researched but little is known about the pathogenesis of associated symptoms. Resent studies has suggested that the incidence of Chiari malformation with tonsilar decent is between 0.56 and 0.78% however the degree of foramen magnum obstruction may be a better predictor of symptomatic Chiari than the degree of tonsilar descent.
Methods. Retrospective analysis of MRI scans of patients with chiari malformation in the last 5 years in a large referral neurosurgical centre. 101 patients were operated on, 60 met the criteria for the study. 60 patients who were operated on for other pathologies were used as a control group. Image metrics were used to measure foramen magnum size, obstruction, and tonsilar descent.
Results. Patient age ranges from 5 years to 72 years. Tonsilar decent recorded ranges from 4mm to 15mm in the chiari group. Adults had greater tonsilar decent than paediatric patients. The percentage of foramen magnum occupied by CSF ranges from 0.69 to 16 percent in the chiari group with an average of 3.3%. There was poor correlation between the tonsilar decent and foramen magnum obstruction. Post foramen magnum decompression, the average percentage of foramen magnum occupied by CSF was 73.8%. In the Control group, the average percentage of foramen magnum occupied by CSF was 72% with ranges of between 48.38 and 81.51%. The tonsilar decent ranges from 0.00mm i.e. those that are above foramen magnum to 5.20mm below the foramen magnum.
Conclusions. Foramen magnum obstruction is a better predictive factor for symptomatic chiari malformation than tonsilar herniation.

TM3-5: Presentation and neurosurgical management of brain tumours in children under one year of age: Experience of 76 consecutive cases

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Objectives. Tracking changes in presentation and management of these challenging tumours.
Design. Case series.
Subjects. All children under 1 year of age at diagnosis of brain tumour, since previous series.[1]
Methods. Database interrogation and casenote review.
Results. 76 consecutive children identified. The age at presentation (median) was 180 days (range 0–351). M:F ratio was 47:29. 63% of tumours were supratentorial, 27% infratentorial and 1% both. 70 children (92%) underwent ≥ 1 neurosurgical procedure, of which 65 (85%) had surgery on the tumour. 25 (33%) underwent gross total resection, with 25 (33%) requiring CSF shunt. There were 2 perioperative deaths. The most common tumours were choroid plexus neoplasms (16) $>$ astrocytomas (11) $>$ PNET (9) $>$ other glioma (7) $>$ ATRT (6) = GBM (6) = ependymoma (6) $>$ teratoma (4), also 11 miscellaneous neoplasms. 34 (45%) children received chemotherapy and 7 (9%) received

radiotherapy. Survival was 91% at 1 month (68/75), 70% at 6 months (48/69), 64% at 1 year (44/69), 43% at 5 years (24/56) and 27% at 10 years (12/45). Prognosis was better for low-grade gliomas and choroid plexus tumours. At 5, 48% of survivors were in mainstream education, with 28% requiring assistance and 24% in special education.
Conclusions. Compared to our previous series,[1] overall survival was unchanged. We will discuss the management of these complex cases.

Reference

1. Kane PJ, Phipps KP, Harkness WF, Hayward RD. Intracranial neoplasms in the first year of life: results of a second cohort of patient from a single institution. *Br J Neurosurg* 1999;13:294–8.

TM3-6: Ventricular shunting in neonates and infancy and development of plagiocephaly: How serious is it?

R. Chawla, S. Roberts & G. Solanki

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Objectives. To establish if there was a link between position of a ventricular shunt and the subsequent development of plagiocephaly.
Design. Retrospective cohort study.
Subjects. All children with a ventricular shunt inserted from 2006 onwards with follow up imaging. Exclusion Criteria: pre-existing plagiocephaly, bilateral ventricular shunts, no follow-up imaging.
Methods. The pre-operative, post-operative and follow-up CT images of all patients were examined. We noted the shunt insertion site and side and subsequent development of positional plagiocephaly.
Results. Of 455 consecutive children, 374 had appropriate imaging identified, 81 were excluded. There were 225 boys and 149 girls. Ages ranged from 0 to 16 + years. 121 (32.3%) developed plagiocephaly following shunting, 88% on the contralateral side. Under 12 months 51/128 (40%) developed plagiocephaly. The risk of plagiocephaly was 2.33 greater than between 1 and 3 years old (7/41, 17%) odds ratio of 3.21 ($p < 0.008$). The risk of a posterior parietal shunt causing plagiocephaly vs anterior frontal horn position was 3.41 greater with a odds ratio of 4.71 (Fisher's exact test $p < 0.0016$).
Conclusions. Shunt insertion in infants is associated with the greatest risk for development of positional plagiocephaly, contralateral in $> 80\%$. Children may be spending an excessive amount of time lying on the contralateral side. This highlights the need for active measures to prevent development of plagiocephaly. Specific nursing, discharge advice and regular observational follow-up must be undertaken.

TM3-7: Does accumulation of neurotransmitters in stagnant interstitial fluid play a part in the generation of pain in syringomyelia?

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Objectives. Pain is common in syringomyelia and typically resistant to treatment. Symptoms may improve after lumbar puncture (LP) but it is unclear whether this is physiological or a placebo effect. Post-mortem studies indicate a build up of substance P within the cord, in syringomyelia, which may have a bearing upon the generation of the pain. We speculated that improvement following LP may be due to "wash-through" of neurotransmitters.
Design. Assays of substance P, gamma amina butyric acaid (GABA) and calcitonin gene related peptide (CGRP) in CSF from patients with idiopathic syringomyelia, patients with Chiari malformations and patients with normal pressure hydrocephalus (NPH).
Subjects. Seven patients with idiopathic syringomyelia, who complained of somatic pain, 7 patients with Chiari & syringomyelia, with persisitng pain after surgery, 7 patients with persisting headache after craniovertebral decompression for Chiari without an associated syrinx and 7 patients with normal pressure hydrocephalus.
Methods. ELISA assays of substance P, GABA & CGRP, in CSF samples from each patient, in each study group.
Results. No differences were detected in levels of substance P or CGRP between any of the groups studied. Comparing NPH (pain free) patients with groups experiencing pain revealed significantly higher GABA levels in symptomatic patients.
Conclusions. Pain accompanying Chiari or syringomyelia is associated with raised GABA levels in CSF but it is unclear whether this accounts for the symptomatic response to LP in syringomyelia patients.

TM3-8: Parietal foramina and relationship to syndromic and non-syndromic craniosynostosis

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Objectives. Parietal foramina (PFM) are congenital calvarial abnormalities causing symmetrical paired round defects in the parietal bones. Mutations in MSX2 and ALX4, lead to abnormal ossification causing isolated enlarged PFM; however there are reports associating PFM with craniosynostoses. We ascertain the incidence and size of PFM in all patients with syndromic and non-syndromic craniosynostoses.
Design. Retrospective cohort study.
Subjects. All patients with craniosynostoses from 2001 onwards, presenting to Birmingham Children's Hospital.
Methods. CT images of all patients were examined for presence and size of PFM using PACS. Occurrence of other foramina and ossification defects was noted.
Results. A total of 474 patients with 3D CT images were found. 64 children (13.5%) had syndromes (Apert's, Crouzon's, Muenke's, Pfeiffer's, Saethre-Chotzen) and 410 (86.5%) were non-syndromic cases of craniosynostosis. PFM were observed in 13 (20.5%) syndromic and 20 (4.9%) non-syndromic children giving a risk ratio of 3.4 (95%CI 2.075 – 5.5921), Odds ratio of 4.97 and Fisher's $p < 0.00010$. Pfeiffer's 75% (3/4) of and Saethre-Chotzen 62% (8/13) showed the highest frequency. In addition, occipital foramina were

also present in 15 (23.4%) syndromic and 22 (5.4%) non-syndromic children.
Conclusions. There is an overall incidence of foramina in craniosynostoses of 13.3%. Parietal foramina occurred in 7% with an incidence being 5 times greater in syndromic cases. Future work includes genetic studies of patients with PFM and follow-up to establish clinical correlations including raised ICP.

TM4 – Neuro-oncology

TM4-1: Multimodal MRI to characterise the invasive margin in cerebral gliomas

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Objectives. Invasion in glioblastomas is a cardinal feature and major cause of treatment failure. As the invasive margin cannot be seen with conventional MRI it has not been studied in patients. As invasion is a multi-stage process it requires a multimodal approach to study. The aim of this study is to explore the microenvironment of the invasive margin using multimodal MRI.
Design. Prospective multimodal MRI cohort study.
Subjects. 55 patients with confirmed glioblastomas (mean age 58.4, range 31.4 – 71.6; 38 males).
Methods. Patients were imaged pre-operatively at 3T with conventional MR, DTI, perfusion MR and multivoxel MR proton spectroscopy. The processed data sets were coregistered and the invasive region defined from the DTI.[1] Measurements of rCBV and metabolite concentrations of NAA, glutamate, choline, myoinositol and lactate were made in invasive and non-invasive regions.
Results. rCBV in invasive regions was significantly higher than in non-invasive regions (mean 2.1 vs 1.5; $p = 0.001$) suggesting increased vascular density and angiogenesis in these areas. Spectroscopy data showed that in invasive areas there is a significant decrease in NAA (a marker of intact neurons), myoinositol (a marker of glial viability) and glutamate (a marker of the intact glial-matrix) without any increase in choline (cellular proliferation) or lactate (hypoxia).
Conclusions. MRI can detect changes in the tumour invasive microenvironment and may allow us to study invasive behaviour in glioma patients.

Reference

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TM4-2: Visual outcome following surgical resection of compressive parachiasmal lesions

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Objectives. To compare visual outcomes following the surgical resection of compressive parachiasmal lesions.
Design. Retrospective case series.
Subjects. 89 patients were identified. All patients with pituitary tumours underwent surgical resection and were included in the study, but 12 patients with meningiomas were managed non-operatively and were therefore excluded.
Methods. A 3-year retrospective review of all patients presenting with visual failure to a single neurosurgical centre. Analysis of visual deficits at presentation, histology, surgical approach and visual outcome.
Results. 75 patients were included in the study [M:F 37:39; age 18–85 years]. Histological analysis confirmed 51 pituitary adenomas (67%), 15 meningiomas (20%), 9 other sellar pathologies (12%) and 1 non-diagnostic biopsy (1%). 33 pituitary adenomas were operated on using a microscopic approach (65%) and 18 via the endoscopic route (35%). All meningiomas were operated on via a craniotomy. Visual deficits at the time of surgery: Meningiomas: hemianopia 15%, a greater deficit 85%; Pituitary adenomas: quadrantonopia 26%, hemianopia 67%, a greater deficit 7%. Visual outcome: Meningiomas: better 46%, same 27%, worse 27%; Pituitary adenomas: better 86%, same 12%, worse 2%.
Conclusions. Patients with pituitary adenomas had better visual outcomes following surgery but patients with meningiomas had a greater visual deficit at the time surgery. Further work is needed to establish whether the type of compressive tumour affects the degree of post-operative visual recovery.

TM4-3: Comparison of mortality and quality of life in patients with and without carmustine wafers inserted during primary surgery for high grade glioma

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Objectives. To determine the impact of using carmustine wafers during primary surgery for high grade gliomas on patient survival and performance status.
Design. Single centre prospective study.
Subjects. 35 patients undergoing total macroscopic excision of grade III or IV gliomas between December 2011 and April 2013.
Methods. Patients divided into two groups: those where carmustine was used (Group A) and where it was omitted (Group B). All patients had high grade gliomas and MR verified excision of at least 85% of the tumour. At least 14.2mg carmustine was used in Group A patients. Selection into groups was based on standard practice. Patients were admitted into Group B if the patient refused carmustine, the drug was unavailable or intraoperative frozen sections were equivocal. Karnofsky

performance scores (KPS) were obtained before surgery and at 3 and 6 months after surgery.
Results. There were 24 Group A and 11 Group B patients. 12 Group A patients (50%) and 4 Group B patients (36%) died over the study period died (not statistically significant). However, at 3 months, the decrease in KPS was greater in patients without carmustine (Group A 10.6, Group B 21.3) and the difference was even greater at 6 months (Group A 15.3, Group B 30).
Conclusions. There is no difference in survival between the two groups. However, there is a clear trend at 3- and 6-months that patients where carmustine were used had a better performance status.

TM4-4: Transcriptomic profile of human primary brain tumours

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Objectives. The main objective of the study is to identify the epigenetic basis of human primary brain tumours.
Design. Using next-generation sequencing techniques we have assessed the chnages in gene expression taking place in resected brain tumour samples.
Subjects. We have randomly selected ten patients undergoing brain tumour surgery.
Methods. We selected three different potential sample sites could be identified pre-operatively on their MRI scan; apparently normal brain that required resection en route to the tumour; apparently "low grade" areas; and in frankly malignant areas. We investigated the expression landscape of these human PBTs, using high-throughput sequencing. We identified coding and non-coding RNA transcripts associated with different types of brain tumours. Validation by qPCR was performed in 10 differentially expressed genes.
Results. Transcriptome analysis identified a group of genes significantly mis-regulated in glioblastomas. In addition, this analysis has revealed significant differences with glioblastoma histological grade. The expression alterations included previously reported oncogene, tumour suppression and cell cycle-related genes that are mis-regulated in brain tumours. However, we also found a significant mis-regulation of non-coding RNA transcripts.
Conclusions. These results support the hypothesis that primary brain tumour cells have stem cell-like components that may be regulated epigenetically to drive tumour growth.

TM4-5: Meningioma – predicting recurrence. A large and long term retrospective and prospective clinical and neuropathological study

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Objectives. Whether it is possible to predict the recurrence of Meningioma based on histopathological and/or clinical factors.
Design. A prospective and retrospective study.
Subjects. 97 patients operated consecutively under the care of one neurosurgeon between 1988 and 1998.
Methods. The WHO criteria, progesterone receptor status A&B, HER2 and Ki67 expression were reviewed. Antibodies against progesterone A&B receptor isoforms were assessed using a new technique. We devised a quantifiable progesterone receptor status staining technique using the Allred criteria (breast cancer).
Results. There were 74 grade I meningiomas. 22 atypical grade II and only one grade III. A score of 6 or above was noted in 77% of cases with the PR-A, whereas it was 63% with PR-B. Among the grade II meningiomas, 63% had a score of 6 or more with PR-A and 31% with PR-B. The grade III meningioma had a PR score of 8. On HER-2 staining, only one of the 97 cases showed any significant cytoplasmic staining. The mean proliferative index for grade I meningiomas was 4.0 and that for grade II was 12.7. The clinical recurrence rate was 9 patients (9.3%).
Conclusion. Although incomplete surgical excision was associated with a higher recurrence rate – the majority of incompletely excised tumours did not recur clinically. Similarly, normal expression of progesterone receptor, low Ki67 and WHO grade I did not confer safety. Recurrence prediction is difficult. All patients may need to be followed for life with suitable imaging.

TM4-6: Comparison of the Graded Prognostic Assessment (GPA) with the Recursive Partitioning Analysis (RPA) as a prognostic tool for patients undergoing stereotactic radiotherapy (SRT) for brain metastases

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Objectives. Brain metastases are managed with a combination of whole brain radiotherapy, surgery or stereotactic radiotherapy(SRT). The Recursive Partitioning Analysis(RPA) is a prognostic score based on age, performance score and extra-cranial disease and can aid treatment decisions. The Graded Prognostic Assessment(GPA) score is a tool which utilises cancer-specific and patient factors to risk-stratify patients. We reviewed outcomes of patients treated with SRT based on GPA scores versus RPA to evaluate its prognostic value.
Methods. We reviewed the medical notes of patients treated with SRT between February 2011 and January 2013. Survival was assessed from the start of SRT and analysed based on GPA and RPA scores.

Results. 74 patients were treated with SRT. Karnofsky Performance Scores were 100 in 27(37%), 80–90 in 41(56%) and 60–70 in 6(8%) patients. The RPA classified 19 patients(26%) as Class 1 and 55(74%) as Class 2. The GPA classified 5 patients(7%) as having unclassifiable disease, 18(24%) scored 3.5–4, 24(32%) scored 2.5 – 3, 26(35%) scored 1.5–2 and 1 scored 0–1. Median follow-up was 22 weeks. Median survival was 30 weeks in the RPA Class 1 and 20 weeks in the RPA Class 2 groups. Median survival by GPA score was 30 weeks for score 3.5–4, 18 weeks for 2.5–3, 16 weeks for 1.5–2 and 38 weeks for 0–1.
Conclusions. The GPA score showed a prognostic trend similar to published data and to the RPA. Further investigation into the value of these prognostic criteria as an aid to patient selection is needed.

TM4-7: A comparative audit of endoscopic and microscopic pituitary surgery at a single neurosurgical centre

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Objectives. To compare outcomes following endoscopic and microscopic transsphenoidal pituitary surgery.
Design. A retrospective audit of all operative pituitary cases managed by the Essex Pituitary Service between January 2009 and September 2012. Key audit measures included length of surgery, length of hospital stay, complications and mortality, extent of tumour resection, visual outcome and endocrine outcome.
Subjects. 104 procedures performed in 102 patients [M:F 58:44; age 18–85 years (median: 56 years)]. Type of surgery: microscopic 68 (65%), endoscopic 36 (35%).
Methods. A retrospective review of case notes, imaging, histology and laboratory results.
Results. Length of surgery (mean): microscopic 111 minutes, endoscopic 156 minutes ($p < 0.0001$). Median length of stay was 4 days for all patients. Overall complication rate of 13%: microscopic 16%, endoscopic 6%. Overall mortality rate was $<1\%$. Complete tumour resection: microscopic: 41%, endoscopic 33%. Visual outcome: microscopic: better 79%, same 14%, worse 7%; endoscopic: better 87%, same 13%, worse 0%. New post-operative pituitary deficit: microscopic 57%, endoscopic 44%.
Conclusions. Microscopic transsphenoidal surgery was statistically faster than endoscopic surgery in this study however the observed trends suggest that endoscopic surgery is associated with a lower complication rate, better visual outcome and a lower need for post-operative hormone replacement therapy.

TM4-8: Outcomes following surgical debulking of high-grade gliomas in an elderly patient cohort

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Objectives. To report outcomes for high-grade cerebral gliomas in an elderly patient cohort.
Design. Retrospective, single-centre cohort study.
Subjects. 27 elderly patients (>70 yrs) who underwent craniotomy and debulking for a single supratentorial high-grade cerebral glioma between January 2010 and December 2012 were identified.
Methods. Data was extracted using CANISC and Welsh Clinical Portal and analysed using SPSS® v16.0 (Chicago, Illinois, US).
Results. The median inpatient stay was 5 days. The median post-operative survival time was 166 days (1-year survival rate of 15%). Complications were seen in 6 patients (22%), with 3 occurring in the early post-operative period (<30 days). No salvage surgery was performed. 26 patients (96%) were referred to oncological services post-operatively. For 4 patients (15%) no adjuvant treatment was recommended. In 23 patients (85%) for whom adjuvant therapy was planned, 7 (30%) was with 'palliative intent' and 16 (70%) with 'radical intent'. In 23 patients for whom radiotherapy was planned, 18 completed their planned regime (88%). In the 22 patients for whom adjuvant chemotherapy was planned, 10 (45%) completed their planned course of temozolomide. Post-operative survival was significantly greater in the 'radical intent' group in comparison to 'no therapy planned' ($p < 0.01$).
Conclusions. This study demonstrates that elderly patients with high-grade gliomas can be safely and efficaciously managed with surgical debulking and aggressive multimodal adjuvant therapy, with acceptable complication rates.

TM5 – Functional

TM5-1: A CRW and Leksell Stereotactic Frame Positioning Aid (SFPA)

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Objectives. A novel device is proposed for positioning and holding the CRW and Leksell stereotactic frames in relation to the head prior to the insertion of skull screws as an alternative to the use of in ear bars.

Design. The present invention is a removable frame attachment that holds the frame in position but allows for fine adjustment, allowing a single operator to swiftly and accurately position the frame.
Subjects. 22 consecutive patients undergoing stereotactic insertion of DBS electrodes in two neurosurgical centres.
Methods. We looked at the alignment error during application, the time required to apply the frame and the number of operators.
Results. 18 out of 22 patients used the proposed device had better outcomes in terms of alignment (AC-PC alignment error of 0.38mm as opposed to 1.25mm in the other group 4 out of 22 patients who did not use the SFPA), the time of application was significantly shorter (12 min vs 26 min) and the number of operators required (1.94 vs 3).
Conclusions. This device helps reduce the frame alignment error, time of application and number of people required to fix the frame. It also offers a much more comfortable option than the current method of fixing the frame.[1,2]

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TM5-2: Vagal nerve stimulation in epilepsy: A 12-year series

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Objectives. While the role of vagal nerve stimulation (VNS) as an adjunct in the treatment of refractory epilepsy is recognised, its exact benefits divide many in the neurosurgical community. We sought to answer that question by reviewing our VNS practice.
Design. Retrospective review of patients with medically refractory epilepsy identified from a prospective database run by a specialist nurse. Following implantation, patients were reviewed at 3 months, 1 and 5 years.
Subjects. Patients receiving VNS in one centre and treated by one lead surgeon between August 2000 and December 2012.
Methods. Primary end-point measures were seizure frequency and severity + quality of life (QoL). Secondary end-point measures included anti-convulsant use.
Results. 202 patients were treated (mean age 35.1 years) with a mean follow-up of 7.1 years (3 months – 12 years) 19 patients achieved seizure freedom (2 being weaned off anticonvulsants); a further 130 patients achieved a good-excellent response ($>50\%$ reduction in frequency $\pm$ severity $\pm$ QoL). The average response time was between 1 and 3 years with a sustained benefit at 7 year follow-up. 32 patients had no response at all Most patients remained on anticonvulsant polytherapy irrespective of outcome.
Conclusions. In our series, 149/202 patients (74%) achieved $>50\%$ reduction in seizure burden with a 9% seizure-freedom rate. Patients had a sustained benefit from VNS implantation. VNS is at least equivalent to adding a new first-line anticonvulsant in the treatment of medically refractory epilepsy.

TM5-3: Efficacy of vagal nerve stimulation after lead revision surgery

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Objectives. Vagal Nerve stimulators (VNS) have been demonstrated to be efficacious in medically intractable epilepsy. However hardware failure, most notably in the VNS leads, can necessitate lead replacement. Lead revision requires dissecting the spiral electrodes off the vagus nerve. Scar tissue can engulf the leads and the nerve with important vasculature in the vicinity making dissection difficult. Our aim was to characterise lead failure and to examine VNS efficacy after new leads are wrapped around a previously used segment of the nerve.
Methods. We retrospectively reviewed all VNS lead revisions in our institute performed between January 2005 and December 2012.
Results. 39 patients underwent lead revision surgery (33 adults, 6 paediatric). The most frequent reason was high lead impedance. The average time to revision was 76 months (range 23–132 mths). The average duration of revision surgery was 178 minutes. All our patients had more than 6 months follow-up after revision surgery and seizure reduction efficacy was comparable to initial VNS implantation in 95% of patients. 6 patients had transient hoarseness of voice and 1 had mild dysphagia.
Conclusions. Removal of old leads and replacement with new leads over a previously used segment of the vagus nerve is as efficacious in seizure reduction as initial VNS implantation. We also describe our operative technique with focus on complication avoidance. Our series is one of the largest to be reported to date and our findings corroborate previous similar studies.

TM5-4: Cognitive outcomes after posterior subthalamic area deep brain stimulation (PSA-DBS) for essential tremor (ET) with and without diffusion tensor imaging (DTI)

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Objectives. Cognitive outcomes after posterior subthalamic area deep brain stimulation (PSA-DBS) for essential tremor (ET) with and without diffusion tensor imaging (DTI).
Design. Longitudinal study.

Subjects. Patients were divided into two groups: those with DTI-guided electrode insertion (5 patients) and those where electrodes were inserted in the conventional manner (6 patients). Mean age at preoperative cognitive evaluation was 69.39 ± 13.12 and premorbid IQ was 103.90 ± 9.64.
Methods. Neuropsychological tests were administered preoperatively and 6 months after surgery with stimulators switched on. Tremor scores were obtained before surgery and 3, 6 and 12-months postoperatively.
Results. Mild decrements in memory and verbal fluency were observed following surgery, which did not reach statistical significance. However there was a greater decline in semantic fluency ($p = 0.052$) and clinically meaningful episodic memory deficits in the non-DTI group as compared to the DTI-group. The average tremor improvement was 81.90% (59–95), 87.30% (80–100) and 86.67% (62–99) at 3, 6 and 12-months respectively with no significant difference in either study group.
Conclusions. This is the first study to evaluate the effects of DTI-guided PSA-DBS on cognition and memory. Our preliminary results concords with emerging literature that PSA is a safe and effective target for treating ET. The finding of better cognitive outcomes in the DTI group has significant clinical implications and thus warrants further investigation with a larger sample size.

TM5-5: Is microvascular decompression of facial nerve effective and safe treatment for hemifacial spasm - Single centre experience

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Objectives. To examine the efficacy and safety of microvascular decompression of facial nerve for hemifacial spasm.[1,2]
Design. Retrospective analysis.
Methods. We retrospectively analysed patients operated in our centre by a single surgeon during period of between 2007–2012. Each patient was reviewed by an independent neurologist after surgery and outcome was recorded.
Results. A total of 35 patients (21F/14M) were operated during this period with Median follow of 2.8 years. 88% patient had complete resolution of their symptoms with good outcome. 12% patients didn't have any improvement after operation. However, 3% patient had redo surgery and their symptoms improved after second operation. Post-operative complications were noted in 12% patients. 6% patient has post-operative transit mild facial weakness which improved within 6 weeks after surgery Only 6% had hearing problem after surgery which improved in most of cases. Only 3% patients had permanent cranial nerve dysfunction. No mortality was noted in our series.
Conclusions. Microvascular decompression is the effective surgical modality available for the treatment of HFS. Results of this study indicate that such technique can be performed without higher rates of morbidity or mortality.

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TM5-6: Peripheral neurectomy: An undervalued treatment option for trigeminal neuralgia

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Objectives. We feel that peripheral neurectomy could be a useful option in selected patients with trigeminal neuralgia. Our objectives was to characterise the clinical profile of patients treated by this method prior to neurectomy and to study the clinical outcome and complications.
Methods. A retrospective study of 18 patients who underwent a total of 20 peripheral neurectomies for trigeminal neuralgia over the last 15 years. Mean age was 69 years (48–89). All had infraorbital nerve avulsions performed under general anaesthesia. 16 had undergone various previous surgical treatments. Satisfaction questionnaires were used to follow-up patient outcome and overall satisfaction.
Results. Of the 18 patients, 16 enjoyed complete pain relief and 2 obtained partial pain relief, following the neurectomy. The pain free period lasted a mean of 31 months (12–82). 14 suffered minor recurrence in pain, of which 2 had a repeat neurectomy with one achieving a good outcome while the other retaining minor symptoms. 2 underwent thermocoagulation, and 2 underwent microvascular decompression. No complications were reported. Satisfaction questionnaires revealed that 12 patients still experienced discomfort, but rated the treatment as excellent or good. All would recommend this treatment and 16 would have it again if required.
Conclusions. Peripheral neurectomy is both an effective and safe treatment for trigeminal neuralgia providing good pain free periods. It should be included in the routine armentatorium of surgical treatment options.

FM6 – Spine

FM6-1: Utility of routine biopsy at vertebroplasty in the management of vertebral compression fractures – a tertiary centre experience

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Objectives. To assess the utility of routine biopsy at vertebroplasty for vertebral compression fracture (VCF), as a tool in the early detection of malignancy in presumed benign VCF.
Design. Prospective observational data collection with retrospective analysis of the data.

Subjects. 147 consecutive patients underwent vertebroplasty, of whom 135 had routine intraoperative biopsy, between April 2006 and March 2011 at a tertiary hospital.
Methods. Patient data were collected on history and examination, level(s) of augmentation, preoperative laboratory tests and MRI, histology results, and subsequent management.
Results. In 86 patients with presumed osteoporosis and no prior cancer diagnosis, 4 (4.7%) had a malignant VCF. In 20 known cancer patients presumed to be in remission, 2 (10%) had a malignant VCF. Routine vertebral biopsy returned an overall cancer diagnosis rate of 5.7% (6/106) when combining the two groups of unsuspected patients. In these 6 patients, history, examination, laboratory tests and pre-procedure imaging all failed to suggest malignancy diagnosed at routine biopsy. The complication rate was low at 6% with zero related mortality.
Conclusions. Routine biopsy performed at vertebroplasty may diagnose cancer in unsuspected patients or active malignancy in patients previously thought to be in remission. This will expedite patients' subsequent cancer management. Routine biopsy does not add morbidity to the procedure. We advocate biopsy at each level of VCF to maximise diagnostic yield and avoid missing a malignancy at a single level.

FM6-2: Antibiotic therapy for Modic 1 related chronic low back pain

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Objectives. Chronic low back pain is strongly associated with Modic 1. The aim was to assess the efficacy and tolerance of the recently described Danish antibiotic protocol in Modic 1 related chronic low back pain (CLBP).[1]
Design. Prospective audit of pain, disability and complications associated with co-amoxiclav 125/500 tds for 100 days.
Subjects. 30 adults with severe persistent non-specific CLBP, no systemic symptoms, normal inflammatory markers, unresponsive to conventional conservative therapy in whom the MRI revealed Modic 1.
Methods. Prospective audit of outcome utilising VAS and Rowland Morris pain and disability scales taken before during and after the course of antibiotics with an analysis of associated side effects. Median lfollow up 140 days.
Results. All parameters of pain and disability improved; several achieved statistical significance including:days with pain,hours with pain per day, back and leg pain VAS scores and median limitation on activity. In addition the median time to improvement starting matched that of the Danish RCT at 6 to 10 weeks. Complications: manageable lose stools and candida.
Conclusions. The treatment response was encouraging, mimicked Danish RCT and was well tolerated. This is as yet the only independent data concerning this unique management of otherwise non-specific CLBP.

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FM6-3: The worse you are; the better you get? Correlating outcomes in spinal claudicants with degree of radiological stenosis

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Objectives. To assess the relationship between degree of radiological stenosis and outcomes from surgery for lumbar stenosis.
Design. Retrospective analysis.
Subjects. Consecutive patients undergoing elective surgery for symptomatic (claudicant) lumbar stenosis between 01.08.2011 and 01.10.2012.
Methods. Electronic theatre database and patient record systems to obtain patient details including preoperative assessment, operative notes and at least a 3-month follow up. PACS records for the relevant image analysis.
Results. 158 patients. On pre-op MRI 91% were Schizas grade B-D. The average pre-op claudicant distance was 213 yards; post op 1523 yards. The average pre-op symptom severity was 2.4 (0 – asymptomatic; 3 – severe symptoms); post-op – 0.9. Pre-op claudication and patient-reported symptom severity directly correlated with the degree of radiological stenosis. 4% were symptomatically worse following surgery, 18% unchanged and 78% improved. The degree of improvement correlated with the radiological degree of stenosis, with the most benefit seen in Schizas grade D.
Conclusions. Based on the pre-operative radiological appearances we may be able to predict the potential benefit from surgery for symptomatic lumbar canal stenosis. This contradicts the findings from the original study.[1]

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FM6-4: A midline-preserving decompressive surgical technique (spinous process osteotomy) is superior to formal laminectomy for patients with lumbar stenosis secondary to degenerative spondylolisthesis

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Objectives. To determine the outcomes of spinous process osteotomy (SPO) and formal laminectomy for patients undergoing lumbar decompressive surgery for spinal stenosis.

Design. Prospective observational study. Data were collected using SPINE TANGO over a 12 month period.
Subjects. 200 patients underwent lumbar decompressive surgery. 76 patients were included in the analysis of which 21 patients had a SPO and 55 patients had a laminectomy.
Methods. We compared the pre and post-operative Core Outcome Measures Index (COMI) scores for patients who underwent SPO with patients who had laminectomy for lumbar decompressive surgery.
Results. There were no significant difference in age ($p = 0.06$) or gender ($p = 0.87$) for the 2 groups. The mean change in COMI scores were 3.5 in the SPO group and 3.8 in the laminectomy group ($p = 0.74$). There were no significant differences in blood loss ($p = 0.68$), operation time ($p = 0.40$) or dural complications ($p = 0.23$). In patients with degenerative spondylolisthesis, 8 patients had a SPO and 10 patients had a laminectomy with change in COMI of 4.73 and 3.88, respectively ($p = 0.48$). In those with a grade I spondylolisthesis, performing SPO had a significant benefit with a change in COMI of 4.51 as oppose to 2.58 in those without spondylolisthesis ($p = 0.04$).
Conclusions. Spinous process osteotomy is a safe alternative approach for a lumbar decompression. It may be of benefit in those with mild spondylolisthesis and has the advantage of minimising damage to surrounding tissues and preserving ligamentous structures.

FM6-5: Thoracic anterior spinal cord hernia and adhesion – Clinical outcomes for surgical repair and conservative management

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Objectives. Progressive thoracic myelopathy secondary to spinal cord hernia and adhesions is an increasing presentation in our practice. Patients typically present with hemi-cord dysfunction and preservation of posterior column function in the early stages. Worldwide there are close to 126 case reports and we present one of the largest case series.
Design. We present a retrospective analysis of 21 patients with spinal cord hernia and/or adhesions who either underwent surgery or were conservatively managed. Clinical and radiological outcomes were reviewed.
Subjects. The cohort consisted of 12 females and 9 males with an average age of 53 (28–75) years; of these 16 underwent surgery. The follow up period ranged from 1 to 19 years.
Methods. Surgery involved dorsal laminectomy followed by spinal hernia repair (± patch graft) and/or resection of adhesions.
Results. In the surgical group, 11 (69%) patients reported an improvement in symptoms, 5 (31%) had no significant improvement or an improvement followed by a deterioration that required revisional surgery to resect adhesions and scar tissue, where after symptoms remained stable. Of the 5 conservatively managed, in 2 the hernia was an incidental finding, in 2 the symptoms remained stable and in the last, the symptoms resolved.
Conclusions. Surgical treatment is rewarding but when complicated by further scarring can lead to disappointing results. We will further discuss clinical and imaging characteristics aiming to identify those patients with the best chance of recovery.

FM6-6: A retrospective audit assessing the role of CT-guided selective nerve root blocks (SNRBs) in the management of patients with lumbar radiculopathy

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Objectives. To assess the diagnostic utility of CT-guided selective nerve root blocks (SNRBs) in localising the source of nerve root pain and evaluating the need for lumbar decompression surgery.
Design. This retrospective audit looked at all patients who had SNRBs from January 2009 until December 2011 (inclusive) and the presence or absence of early or late pain relief following these injections. The subsequent management of these patients, including conservative management, further SNRBs or surgery, was investigated.
Subjects. Patients were included if they had an SNRB of nerve root levels ranging from L1 to S1 and if the injection was in the nerve root foramen.
Methods. Using electronic and hard copy patient case notes, data detailing patient demographics, details of the SNRB and the management outcomes were collected and analysed. The sample size was 330 patients.
Results. A Fisher exact test demonstrated that patients who have a positive SNRB were more likely to receive lumbar surgery than those with a negative SNRB ($p = 0178$). However, the relationship between having a positive SNRB response and a subsequent positive outcome from lumbar surgery was not statistically significant ($p = 0.756$).
Conclusions. The result of SNRB is being used to select patients with lumbar radicular pain for surgery but a positive response does not predict a successful outcome from subsequent surgery.

FM6-7: Ondontoid fracture management

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Objectives. To assess the management and outcomes of traumatic Ondontoid fractures referred on-call in a regional neurosurgical centre.
Design. A retrospective review of all Ondontoid fractures referred on-call between April 2011–2013.
Subjects. 80 patients with traumatic C2 fractures.
Methods. Patients were identified from the on-call referral book. Data was collected from scans, clinic letters, operative

logbooks and discharge summaries. Ondontoid fractures were classified according to the Anderson-D'Alonzo-Hadley classification system.
Results. Average age of all referred C2 fractures was 72.6. 80% of all referred C2 fractures were Ondontoid fractures. Of these 1 patient had a Type 1 fracture, 61% had a Type 2 fracture, 37.5% had a Type 3 fracture. The patient with a Type 1 fracture was managed conservatively. 77% of Type 2 fractures were managed conservatively, 20.5% were managed with anterior screw fixation, 2.5% were managed with posterior occipital-cervical fusion. 67% of patients with Type 3 fractures were managed conservatively, 17% were managed with Halo vests, 12% with anterior screw fixation and 4% with posterior occipital-cervical fusion. Patients were followed up in clinic with dynamic x-rays. No patient who was managed conservatively required later surgical management.
Conclusions. Our unit's experience demonstrates that conservative management of certain Ondotoid fractures is an acceptable means of treatment, especially in elderly, clinically asymptomatic patients, who may demonstrate a stable non-union.

FM6-8: Invasive spinal schwannomas: A molecular and clinicoradiological study

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Objectives. 1. Evaluate the clinical characteristics and surgical outcome of invasive spinal schwannomas in comparison with conventional intradural schwannomas. 2. To detect and evaluate any differences in gene expression between the two.
Design. Clinical data was extracted from records and pathology specimens were used for microarray analysis.
Subjects. The departmental surgical database revealed 51 consecutive cases of spinal schwannomas over a five year period.
Methods. The clinical,radiological features and surgical outcome of all of the schwannomas were analysed. Surgical pathology specimens from the tissue bank was used to extract RNA for micro array analysis. Functional analysis was used to reveal some of the pathways which may be involved.
Results: Altogether, 51 schwannomas were treated in 51 patients. 10 invasive spinal schwannomas were identified. They were characterised by large size, difficult or incomplete excision and surgery requiring instrumentation. Microarray analysis showed that 946 genes were differentially regulated 1.5 fold, between invasive and non invasive spinal schwanomas. Two genes, namely EGFR and FGF12 were particularly promising as they have been implicated recently in many studies as being responsible for invasiveness of tumours.
Conclusions. Invasive spinal schwannomas differ from the other spinal schwannomas clinically and radiologically. Though histologically identical, there are difference in their gene expression. Surgically they are challenging to manage.

FM6-9: Does early surgical intervention in Cauda equina syndrome improve autonomic bladder function outcome?

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Objectives. Cauda equina syndrome (CES) potentially causes loss of autonomic control including bladder dysfunction resulting in significant disability. There is debate in the literature regarding appropriate timing of surgery. We analysed if operating within 48 hours of onset of autonomic symptoms made any difference to bladder function.
Subjects. We conducted a retrospective cohort study of 103 patient case notes out of a complete dataset of 282 patients between 2000 and 2011 who underwent emergency decompressive surgery for CES at a single neurosurgical centre.
Methods. Data collected: clinical admission, operative details and autonomic outcome at initial follow up. Presentation was categorised into CES with retention (CESR) and incomplete CES (CESI) and duration of autonomic symptoms before surgical intervention (48 hours).
Results. 103 patients presented with CES; 35 cases with CESR and 68 cases with CESI. Average initial follow up time was 90.5 days. For the 34 CESI48hours, 11 had bladder dysfunction (Pearson chi-square $p = 0.001$). For the 35 CESR patients operating within 48 hours or after made no significant difference to the autonomic outcome. All cases were operated within 48hours of admission to the unit.
Conclusions. We identified that decompressive surgery within 48 hours of onset of autonomic symptoms in CESI reduces bladder dysfunction at initial follow up but no difference in outcome was observed in CESR.

FM7 – Vascular/Miscellaneous

FM7-1: Cavernous malformations – trials comparing surgery and stereotactic radiosurgery with conservative management may be unnecessary

B. L. Quah, D. Bhagawati, A. F. Alalade & R. R. Vindlacheruvu

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Objectives. Cavernous malformations (CVM) represent low flow vascular abnormalities with a low bleeding risk. Most CVM are incidental findings on MRI. Consequences of bleeds relate to anatomical location, as do complications of treatment. There has been recent enthusiasm for stereotactic radiosurgery (GK-SRS). We question the need to treat, based on anecdotal evidence suggesting low rates of haemorrhage and disability.

Design. A retrospective analysis of all cavernous malformation patients over a 4 year period using case notes and PACS imaging.
Subjects. 76 patients with cavernous malformations were managed by a single neurosurgeon during this time.
Methods. Outcomes recorded were treatment and complications, and rates and consequences of haemorrhage for conservatively managed cases.
Results. Surgery was undertaken for 10 patients – to prevent recurrent haemorrhage or to facilitate seizure control. GK-SRS was considered frequently but only given for 4 cases. Of those managed conservatively (62), none had a haemorrhage in the follow-up available.
Conclusions. Surgery tends to be offered for high risk locations, based on the disability already experience through haemorrhage. The threshold to offer GK-SRS is falling. Our data suggest that the large majority of patients can be managed conservatively with no adverse effect. Proposed trials comparing surgery and GK-SRS against natural history may have low recruitment rates based upon relative lack of equipoise for most cases.

FM7-2: Microsurgical clipping after endovascular coiling, presentation, surgery and outcomes

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[2]*School of Medicine, University of Southampton, UK*

Objectives. Follow up of aneurysms coiled after SAH may demonstrate recurrence and a risk of further bleeding.[1] We audited a consecutive series of cases in which such recurrences were treated by surgical clipping.
Design. Retrospective case notes and electronic documents review.
Subjects. Patients with recurrence of previously coiled ruptured cerebral aneurysms treated surgically.
Methods. All cases operated between November 2006 and January 2013. Thirty nine patients (mean age 49.08 ± 1.8 years, range 22–70 years) underwent microsurgical clipping of 40 previously coiled intracranial aneurysms
Results. No patient had re-bled before re-treatment of the aneurysm. All aneurysms were on the anterior circulation. Coil compaction was the main cause of recurrence. The mean interval between coiling and clipping was 76 weeks. Ten patients had multiple aneurysms clipped. It was necessary to remove the coil ball in only 2/40 aneurysms. Intra-operative Doppler or ICG angiography was used in 32 cases. The mean length of hospital stay was 3.18 ± 0.43 days. Our study reveals good clinical outcomes with mRS (modified Rankin ccale) of 0 and 1 in 89.7% of patients. 5.1% achieved mRS of 2 while 3 and 4 was scored in 5.2% of patients. No patients died.
Conclusions. Surgical clipping of previously coiled aneurysms is associated with a good outcome in the majority of patients and continues to have a role in the management of these recurrent aneurysms. Clipping was possible without removal of the coil mass in most cases.

Reference

1. Molyneux AJ, Kerr RS, Clarke M, et al. International subarachnoid aneurysm trial (ISAT) of neurosurgical clipping versus endovascular coiling in 2143 patients with ruptured intracranial aneurysms: a randomised comparison of effects on survival, dependency, seizures, rebleeding, subgroups, and aneurysm occlusion. *Lancet* 2005;366:809–17.

FM7-3: MCA aneurysms – It is not all about the coil?

D. Bhagawati, B. L. Quah, S. Chawda, R. R. Vindlacheruvu & K. David

Essex Neurosciences Centre, Queens Hospital, Romford, UK

Objectives. Middle Cerebral Artery Aneurysms (MCA) represent a relatively surgical accessible location for clipping and a potentially technically difficult location for durable endovascular treatment. Analysis all MCA aneurysms treated in 2012.
Design. A retrospective analysis of all MCA aneurysms using case notes and PACS imaging.
Subjects. There were 31 patients treated: 20 endovascular, 11 surgical.
Methods. The following data were analysed: age, sex, mode of treatment, WFNS, Fisher grade, dome to neck ratio, size of aneurysm, endovascular adjuncts, DIND, complications, residual aneurysm on follow up, modified Rankin Score.
Results. In the ruptured group, 15 patients underwent coiling, while 4 patients had clipping. In the unruptured group, 5 patients had coiling whilst 7 patients had clipping. In those patients who received coiling, significant residual aneurysms requiring consideration of treatment occurred in 5 (20%) patients. 3 patients were lost to follow up and 5 patients were yet to receive follow up imaging.
Conclusions. Whilst in the post ISAT era, endovascular treatment remains first line therapy, further trials may be required to evaluate this particular subset of aneurysms, as our data suggest that surgical avenues may result in a lower rate of significant recurrence requiring treatment. The current vogue of using endovascular treatment as first line treatment, this may increase the amount of revisional anuerysmal treatment carrying higher procedural risk in this group.

FM7-4: Do SBNS abstracts punch their scientific weight? A bibliometric analysis of publication rate and impact

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Objectives. To assess the scientific impact of SBNS conferences by calculating the abstract to publication ratio (A:P) and associated bibliometeric parameters.
Design. A retrospective review of SBNS conference proceedings over a five year period (2001–2005). The Spring 2002 conference was excluded as it was held outside the UK and

the proceedings were not published in the *British Journal of Neurosurgery* (BJNS).
Methods. To ascertain whether an abstract resulted in peer-reviewed publication, a range of databases (PubMed, Google Scholar, Medline and Ovid) were interrogated. Abstracts published in full were subsequently assessed for journal impact factor (IF), time of publication and number of citations received.
Results. A total of 494 abstracts were presented. 181 abstracts were subsequently published in full, giving the conference an A:P of 36.6%. Mean time from presentation to publication was 22 months. Top three journals for publication were the *BJNS* (23.2%), *Neurosurgery* (7.7%) and *Journal of Neurosurgery* (7.7%). The IF of journal destinations ranged from no IF to 38.28 (median = 1.97, mean = 4.1). Number of citations ranged from 0–963 (median = 22, mean = 54). The top three units to contribute abstracts were Addenbrooke's (43, 8.7%), Queen's Square (29, 5.9%) and the Walton Centre in Liverpool (28, 5.7%) with A:Ps of 63%, 38% and 57% respectively.
Conclusions. SBNS conferences have a respectable A:P. Those abstracts that are published in full have gone on to gain a considerable number of citations, reflecting their scientific relevance.

FM7-5: Accumulation of EphrinB3 following injury inhibits the differentiation of neural stem/precursor cells and impairs the regeneration of myelin sheaths in the CNS

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Objectives. Myelin regeneration (remyelination) is mediated by a multipotent adult stem/precursor cell population often referred to as oligodendrocyte progenitor cells (OPCs). Differentiation of OPCs is regulated by extrinsic and intrinsic factors, which have only been partially revealed. In the present study we identify a novel signaling mechanism as negative regulator of OPC maturation.
Methods. Primary rat OPC cultures were used to study the effects of EphrinB3 on OPC differentiation in vitro. To asses CNS remyelination in vivo, ethidium bromide was stereotactically injected into the caudal cerebellar peduncle of female Sprague-Dawley rats. To neutralise EphrinB3 epitopes a combination of commercial antibodies was used. The resulting cells/tissue was analysed using a combination of immunohistochemistry, in situ hybridisation, and light and electron microscopy.
Results. We identify Ephrin B3 as a myelin associated protein that inhibits OPC process formation and blocks the formation of mature oligodendrocytes in vitro. Infusion of recombinant Ephrin B3 into demyelinating lesions results in a failure of remyelination caused by an inhibition of OPC differentiation. In contrast, antibody-mediated masking of Ephrin B3 epitopes in vitro as well as in demyelinating lesions of aged rats promotes OPC differentiation and accelerates myelin regeneration.
Conclusions. Our results demonstrate that Ephrin B3 is an important regulator of endogenous stem/precursor cells which can be targeted to promote repair in the CNS.

FM7-6: Cranioplasty complications: an over 6-year retrospective regression analysis

C. S. S. A. Mansi[1], C. H. Lee[1], A. Pearce[1], S. A. R. Nouraei[2], B. Arvin[1] & K. M. David[1]

[1]*Essex Centre for Neurological Sciences, Queen's Hospital, Romford, UK,* [2]*Department of ENT, Queen's Hospital, Romford, UK*

Objectives. Cranioplasty has been shown to have a variable complication rate. The objective of the current study was to identify the surgeon and patient specific factors that are associated with common complications of cranioplasty.
Design. Retrospective case series.
Subjects. All patients who underwent a cranioplasty for any reason at our institution between June 2006 and October 2012.
Methods. Data collection from case notes, PACS imaging, and hospital database. A logistic regression analysis was performed to identify independent predictors of complications following cranioplasty.
Results: 109 patients had 115 cranioplasties. The mean follow up was 13 months during which there were 21 (18.3%) major complications (infection, seizures, haemorrhage, removal). Type of cranioplasty was an independent significant predictor of infection (OR 4.3784, 95% CI 1.27–15.0, p = 0.019), with the highest infection rate in autologous bone cranioplasty (37.5%). Smoking was an independent risk factor for seizures (OR 8.18, 95% CI 1.09–61.50, p = 0.0411). Charlson co-morbidity index predicted the risk of a major complication (OR 2.98, 95% CI 1.0707–8.3271, p = 0.0366). Time since the craniectomy, antibiotic regimen, use of surgical drain, age and sex were not significant predictors of any complication.
Conclusions. We have shown a higher rate of infection in autologous bone than titanium and acrylic cranioplasty and found smoking to be a significant risk factor for the development of seizures. A larger prospective multi-centre study is needed.

FM7-7: Complications following titanium cranioplasty – a retrospective analysis of incidence, type and risk factors in 174 patients

S. Mukherjee, B. Thakur, I. Haq, S. Hettige & A. Martin

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Objectives. To determine the complication rate following titanium cranioplasty and attendant risk factors.
Design. Retrospective review.
Subjects. 174 patients underwent titanium cranioplasty at two hospitals between June 2005 and May 2012.

Methods. Data were collected on patient demographics, primary pathology, complications, skull defect size and location.
Results. Rates of complication and cranioplasty removal were 26% and 10% respectively. Infection was the commonest complication, accounting for 69% of plate removals. Patients with versus without trauma had a greater complication rate (35 vs 21%; $p = 0.04$), plate removal rate (16 vs 7%; $p = 0.04$) and size of defect (93 vs 75 cm^2; $p < 0.001$). Craniectomy-cranioplasty interval of 4–8 months corresponded to the lowest complication rate ($p = 0.04$) and shortest postoperative hospital stay ($p = 0.02$). Bifrontal versus frontal insertion had a greater complication rate (40 vs 14%; $p = 0.04$), plate removal rate (15 vs 7%; $p = 0.04$), and defect area (115 vs 72 cm^2; $p < 0.001$). Patients with a skull defect > 100 cm^2 versus < 100 cm^2 had a higher complication rate ($p < 0.001$), plate removal rate ($p = 0.04$), and longer hospital stay ($p = 0.02$). Defect size correlated with length of hospital stay ($p = 0.01$, Pearson Rank).
Conclusions. Complications following titanium cranioplasty are common. Size of defect, traumatic pathology, bifrontal insertion and delay in cranioplasty < 4 months or > 8 months, each predict risk for complications and lengthy hospital stay, and inform consent for the procedure.

FM7-8: Investigating the role of external ventricular drainage (EVD) in severe head injury management at a major trauma centre

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Objectives. Trauma continues to be a major cause of death & disability in the first four decades of life, with head injury implicated in most cases. The authors explore the role of EVD usage in patients admitted with severe head injury, with emphasis on the management and outcome.
Design. Retrospective case series in a UK Level I Trauma Centre.
Subjects. 139 patients admitted with severe head injury over a 1 year period.
Methods. Cases were identified from the trauma registry. Case notes, radiology and laboratory records were reviewed to collect data. Statistical analysis was with SPSS 15.
Results. 26 died in the first 48 hours with no ICP-driven surgical interventions. 68 needed only ICP monitoring (with/without haematoma evacuation). In 12 patients, primary decompression was done at the time of haematoma evacuation because of brain swelling. Of the remaining 33 patients who had secondary ICP elevation, 15 patients had EVD and 17 were randomised in the Rescue-ICP trial. Subsequently, 2 patients with primary decompression had further ICP elevation and needed EVD. 2 patients with EVD were further treated for elevated ICP - 1 underwent decompression, the other was treated with barbiturate coma. 1 patient with EVD developed infection which was successfully treated.
Conclusions. Patients treated with EVD had a lower risk of needing definitive treatment for ICP control i.e. decompressive craniectomy or barbiturate coma (Odds Ratio = 13.33:1). It is likely that this benefit of EVD usage could also apply in other cases of RICP such as stroke.

FM7-9: Histological effects of fibrin glue and synthetic adhesives on the spinal cord

P. Kalsi, D. Choi & M. Thom

Department of Neuropathology, National Hospital for Neurology & Neurosurgery, London, UK

Objectives. Tissue glues are now commonly used for sealing the dura after brain or intradural spinal surgery. However, little is known about the effect of these glues on the CNS tissues, and they are currently recommended for extradural use only. The operation of brachial plexus reimplantation requires the intradural use of tissue glues because it is difficult to suture reimplanted nerves to the spinal cord. We investigated the effects of Tisseel®, BioGlue® and Adherus® on spinal cord tissue.
Design. A prospective comparative study.
Subjects. 41 Sprague-Dawley (SD) rats.
Methods. In the control Group 1 ($n = 9$), a posterior midline cervical incision was made and an operating microscope used to transect and reposition the T1 dorsal root onto the cord. In Group 2 ($n = 8$) Tisseel® was applied to the repositioned nerve. In Group 3 ($n = 10$) BioGlue® and Group 4 ($n = 14$) Adherus®. At days 7, 14 and 28 the spinal cords were examined histologically and evaluated blindly by a neuropathologist.
Results. The control and Tisseel® groups showed only mild focal inflammation in the cord at all time points. Adherus® and Bioglue® groups showed evidence of spinal cord degeneration. At day 28, there was no foreign body reaction in the control and Tisseel® groups but a mild and moderate reaction in Adherus® and Bioglue® groups, respectively. This was often associated with poor functional outcome.
Conclusions. Tisseel® may be used without significant problems on the spinal cord. BioGlue® and Adherus® may be applied thinly to the outside of the dura to create a watertight closure but but intradural use and contact with spinal tissue should be avoided.

POSTER PRESENTATIONS

Trauma/Head and Spine

P1: C2 Traumatic spondylolisthesis: Fracture patterns and management

C. J. Beagrie, E. Woolley, R. Al-Mahfoudh, W. J. Kitchen & M. Wilby
The Walton Centre, Liverpool, UK

P2: Monitoring of severe traumatic brain injury patients in the UK intensive care units – A national survey

S. Panchatsharam, R. Jain, J. Khan, B. Lewinsohn & D. S. Wijayatilake
Neuro Critical Care Unit, Queen's Hospital, Romford, UK

P3: A national survey of current protocols and management of the traumatic brain injury patients in UK intensive care units

D. S. Wijayatialke, B. Lewinsohn, G. de la Cerda, A. Bellini & S. Panchatsharam
Neuro Critical Care Unit, Queen's Hospital, Romford, UK

P4: A practical scoring system to identify elderly patients with a 'surgical' acute subdural haematoma (ASDH)

J. A. Evans, M. Bailey, A. Vail, P. Tyrrell & H. C. Patel
Salford Royal Foundation Trust, Salford, UK

P5: Thromboprophylaxis in traumatic brain injury: A case-based survey of British Neurosurgical Practice

A. A. Jamjoom, P. Brennan & P. F. X. Statham
Department of Clinical Neuroscience, Western General Hospital, Edinburgh, UK

P6: Reducing the incidence of infections in EVD placement in traumatic head injuries

V. Prasad, C. Gavin & E. McKintosh
Neurosurgery Department, The Royal London Hospital, London, UK

P7: Acute spinal fractures in ankylosing spondylitis. A major trauma center 5-year experience

G. Prezerakos[1], V. Prassad[1], S. Hassan[1] & M. Ng[2]
[1]*Barts & The London School of Medicine and Dentistry, London, UK, and* [2]*Queen Mary University Medical School, London, UK*

P8: Establishing spinal trauma service and electronic patients records – Rooms for improvements

A. M. Hussien, B. Obiado, M. Prime, R. Mobasheri & M. Akmal
Imperial College NHS Trust, London, UK

P9: Chronic subdural haematoma: laterality issues

A. Hamdan[1], J. Barnes[2] & P. Mitchell[2]
[1]*Faculty of Medical Sciences, Newcastle University, UK, and* [2]*Royal Victoria Infirmary, Newcastle upon Tyne, UK*

P10: Acute subdural haematoma (ASDH) in the elderly – What proportion of neurosurgical decisions are made on age alone?

J. A. Evans, A. Vail, Z. Pinto, P. Tyrrell & H. C. Patel
Salford Royal Foundation Trust, Salford, UK

P11: Closing margin: a new method for assessing the risk of ischaemia in TBI patients

G. V. Varsos[1], N. de Riva[2], P. Smielewski[3], J. D. Pickard[3], K. M. Brady[4], M. Reinhard[5], A. Avolio[6], A. G. Kolias[3], P. J. Hutchinson[3] & M. Czosnyka[3]
[1]*Addenbrooke's Hospital, Cambridge, UK,* [2]*Department of Anesthesiology, Hospital Clinic, Universitat de Barcelona, Barcelona, Spain,* [3]*Department of Clinical Neurosciences, Cambridge, UK,* [4]*Baylor College of Medicine, Texas Children's Hospital, USA,* [5]*Department of Neurology, University of Freiburg, Germany, and* [6]*Australian School of Advanced Medicine, Macquarie University, Sydney Australia*

P12: A systematic review of a new minimally invasive technique for evacuating chronic subdural haematomas

A. Chari, A. G. Kolias, S. Bond, T. Santarius & P. J. A. Hutchinson
University of Cambridge & Addenbrooke's Hospital, Cambridge, UK

P13: S100B: A marker in traumatic brain injury (S100B expression in rat organotypic hippocampal slice cultures subjected to hypoglycaemic, hypoxic, excitotoxic and free radical conditions)

J. R. Glazier[1], A. Pringle[2] & A. Belli[3]
[1]*Queen Alexandra Hospital, Portsmouth, Hampshire, UK,* [2]*Southampton General Hospital, Southampton University, Southampton, Hampshire, UK, and* [3]*Queen Elizabeth Hospital, Birmingham University, Birmingham, UK*

P14: TNF, IL-6, ASPA and AQP4 expression in rat organotypic hippocampal slice cultures subjected to hypoxic and excitotoxic conditions

J. R. Glazier[1], A. Pringle[2] & A. Belli[3]
[1]*Queen Alexandra Hospital, Portsmouth, Hampshire, UK,* [2]*Southampton General Hospital, Southampton University, Southampton, Hampshire, UK, and* [3]*Queen Elizabeth Hospital, Birmingham University, Birmingham, UK*

Spine

P15: Surgical outcome of spinal meningiomas

P. Sayal, A. Sudarsanam, A. Zafar, V. Bagga, A. Kailaya-Vasan, S. Sinha, M. Radatz & D. Bhattacharyya
Royal Hallamshire Hospital, Sheffield, UK

P16: Trans-pedicular screw fixation in the thoraco-lumbar spine: the role of pre-operative computed tomographic (CT) measurements

M. J. Asha[1], M. S. Choksey[1], A. Shad[1] & D. J. Beale[2]
[1]*Department of Neurosurgery, UHCW, Coventry, UK, and* [2]*Department of Radiology, UHCW, Coventry, UK*

P17: Management of C2 fractures: retrospective review of clinical outcome and predictive factors

M. J. Asha, B. Budair & A. Saxena
Department of Trauma and Orthopaedics, and Department of Neurosurgery, UHCW, Coventry, UK

P18: Spinal disease in neurofibromatosis type 2: A single centre experience

R. Ma, J. Durie-Gair, D. Scoffings, R. Laing & R. Mannion
Addenbrooke's Hospital, Cambridge, UK

P19: Which patients should we have a higer index of suspicion for MRI scanning for cauda equina?

D. Bhagawati, P. Sharma, J. Shapey, K. Burke, K. M. David & B. Arvin
Essex Neurosciences Centre, Queens Hospital, Romford, UK

P20: Axonal regeneration into a honeycomb collagen sponge combined with bone marrow stromal cells in the injured spinal cord

K. Bhatt[1], M. Enomoto[2], M. Ukegawa[2], T. Hirai[2] & K. Shinomiya[2]
[1]*Imperial College London, London, UK, and* [2]*Department of Orthopaedics and Spinal Research, Tokyo Medical and Dental University, Tokyo, Japan*

P21: Laminotomy laminoplasty in lumbar spinal stenosis: A transverse rotational reconstruction technique

H. A. Elnoamany
Menoufiya University Hospital, Menoufiya, Egypt

P22: 30 days re-operation rate following ACDF surgery (Leeds experience)

S. K. Selvanathan, M. Palin, I. Anderson, G. Towns & A. Tyagi
Leeds General Infirmary, Leeds, UK

P23: The utility of digital rectal examination in cauda equina syndrome

I. Phang[1], R. Sivakumaran[1], D. Tropman[2], A. King[3], T. L. Jones[1] & M. C. Papadopoulos[1]
[1]*Academic Neurosurgery Unit, St George's University of London, London, UK,* [2]*Department of Clinical Physics, St George's Healthcare NHS Trust, London, UK, and* [3]*Stroke and Dementia Research Centre, St George's University of London, London, UK*

P24: Cranial venous sinus stenosis: an underlying cause of Chiari I malformation

S. Muquit, A. A. Moussa, H. Ingale, I. Ughratdar & B. D. White
Queens Medical Centre, Nottingham, UK

P25: Quality of life in cervical spondylosis is improved by NuNec™ artificial disc replacement

A. Borg, P. Kalsi & D. Choi
National Hospital for Neurology and Neurosurgery, Queen Square, London, UK

P26: Anterior cervical discectomy and fusion: An evaluation of post-operative dysphagia and dysphonia

A. Garg[1], M. McLeod[2], H. Hasegawa[2] & S. Bucur[2]
[1]*Brighton & Sussex Medical School, Brighton, UK, and* [2]*Hurstwood Park Neurological Centre, Haywards Heath, UK*

Oncology/Peadiatics/Hydrocephalus

P27: Cell salvage in craniotomy for meningiomas – pilot study of an underused technique

V. Marsh, K. Raveendran, M. Kyte & J. R. Pollock
Essex Neurosciences Centre, Romford, UK

P28: To assess patient survival following re-do craniotomy for recurrent glioblastoma multiforme (GBM)

J. L. C. Dubois[1], J. Lewis[2], A. Joshi[1] & J. Crossman[1]
[1]*Royal Victoria Infirmary, Newcastle upon Tyne, UK, and* [2]*Freeman Hospital, Newcastle upon Tyne, UK*

P29: Rates of infection, re-operation for haematoma and 28-day mortality following craniotomy for supratentorial tumour in 391 consecutive patients

V. Apok, N. Johnston & T. Karabatsou
Salford Royal Foundation Trust, Salford, UK

P30: Changes in serial MR diffusion metrics in low grade gliomas that undergo malignant transformation

A. A. Jamjoom[1], M. A. Manita[2], D. Rodriguez[2], K. Shah[2] & D. P. Auer[2]
[1]*Western General Hospital, Edinburgh, UK, and* [2]*Radiological and Imaging Sciences, University of Nottingham, Nottingham, UK*

P31: Outcomes of foramen magnum decompression in paediatric patients with chiari malformation

D. N. Fitzrol, Richard Digby & Helen Fernandes
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P32: Paediatric cervico-medullary tumours

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P33: Does the size of jugular foramina contribute to the formation or presentation of Chiari malformations?

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P34: An Irish experience with paediatric posterior fossa medulloblastoma

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P35: The surgical management in children with bleeding diathesis: Auditing neurological outcome

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P36: Improving communications with referring teams in paediatric neurosurgical practice: making the most of a referrals database

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P37: Commensal spenoid mucosal bacteria in a cohort of patients undergoing transphenoidal surgery: implications for antibiotic prophylaxis

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P38: The impact of deep brain stimulation on sleep and olfactory function in Parkinson's disease

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P39: Glue Embolisation: Evolution of its use in a single regional neurosurgical service

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P40: WFNS grading of SAH: When and why?

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P41: Transorbital puncture for endovascular treatment of carotid-cavernous fistulae

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P43: Haem scavenging after subarachnoid haemorrhage

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P44: DBS lead localisation in Parkinsons disease patient and clinical corelation with monopolar reviews

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P45: Clinical outcome following paddle lead spinal cord stimulation after failure of cylindrical SCS system

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P46: Intra-operative frozen section histopathology for trans-sphenoidal excision of pituitary adenomas

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P47: Ghost hunting in a CT negative SAH patient – Does the spine matter?

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P50: Routine post-op ct scans following chronic subdural haematoma (CSDH) evacuation: Not a useful investigation

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P51: Evacuate the chronic subdural haematoma: A missed training opportunity

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P52: Dambusters! An audit of theatre utilisation to improve the flow of patients

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P53: Neurosurgery in the elderly: A changing spectrum

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P54: Audit of 30-day neurosurgical readmissions in the United Kingdom: A single centre experience

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P55: Homeways is bestways – a better discharge solution than repatriation for neurosurgery referrals. Results of an audit

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P57: How sticky is the brain? Characterising neurosurgical patty adhesion to brain tissue

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P58: What is the value of placements in neuro-intensive care during foundation and early neurosurgical training?

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P59: Piloting a neurosurgery outreach service

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P60: Making the cut: Obtaining a neurosurgery national training number

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P61: Measures of professionalism in neuro intensive care

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P62: A retrospective study of post-craniotomy infections

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P63: Evaluating the impact of physician associates in the neurosurgical ward based setting

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P64: Use of a cloud-based data archiving elastic-computing telecommunications and database platform for urgent neurosurgical referrals.

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P65: Neurosurgery in UK medical schools: The students' perception

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P66: A decade of neurosurgical negligence claims in the NHS

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P67: Undergraduate neurosurgery teaching in the UK – is there enough and how can we improve it?

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P68: Therapeutic effects of Japanese traditional herbal medicine for chronic subdural haematomas

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P69: Bedside saccadometry as an objective and quantitative measure of hemisphere-specific neurological function in patients undergoing cranial surgery: Interim results of a pilot study

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P70: Wound complications post decompressive hemi-craniectomy – does incision influence outcome?

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P71: No notes, no defence: Improving documentation in neurosurgery

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P72: Is orbital reconstruction required to prevent enophthalmos following resection of sphenoid wing meningiomas? Experience in a single centre over a 3-year period

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P73: Development of a neurosurgical patient-focused ward safety checklist

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